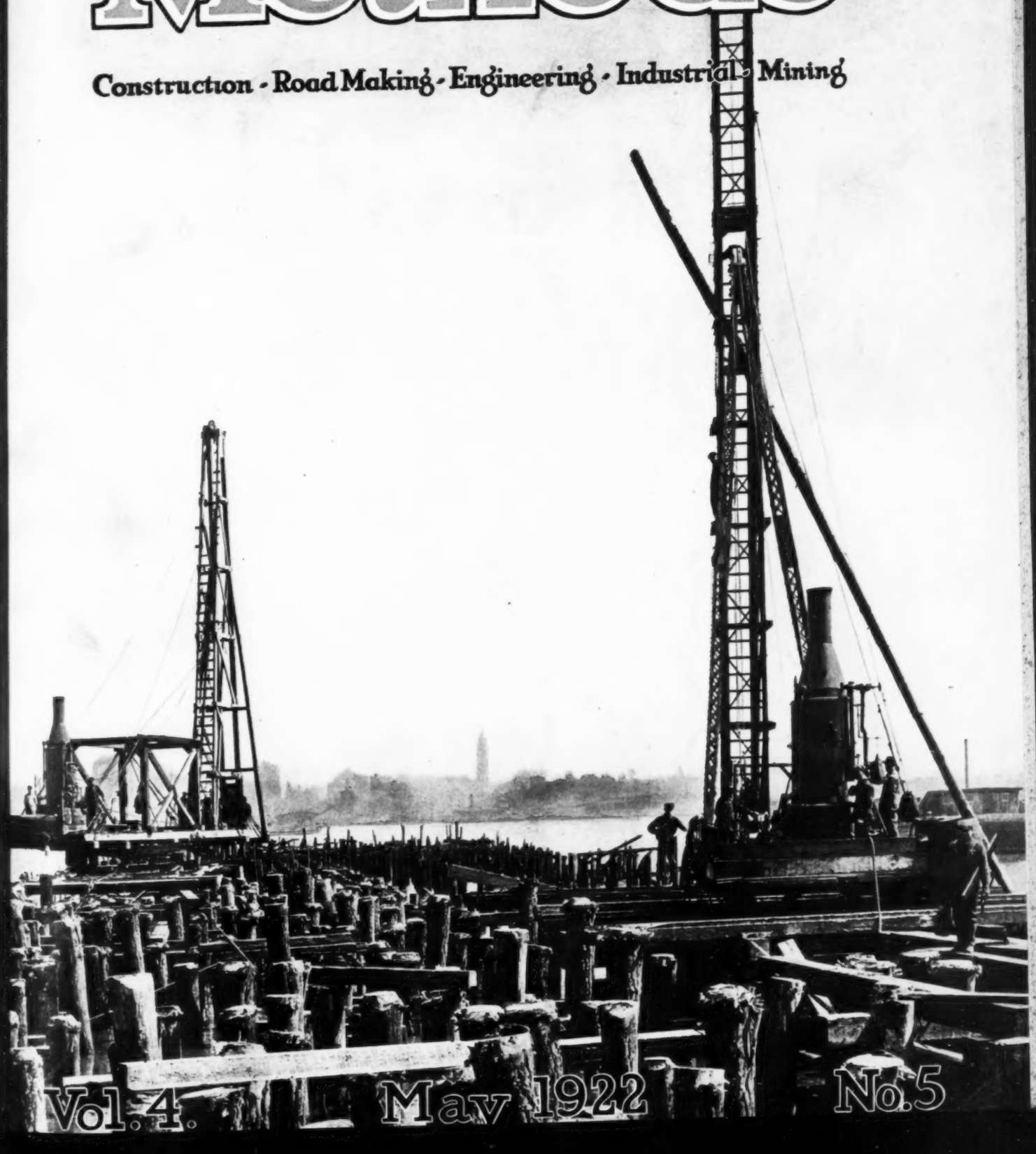
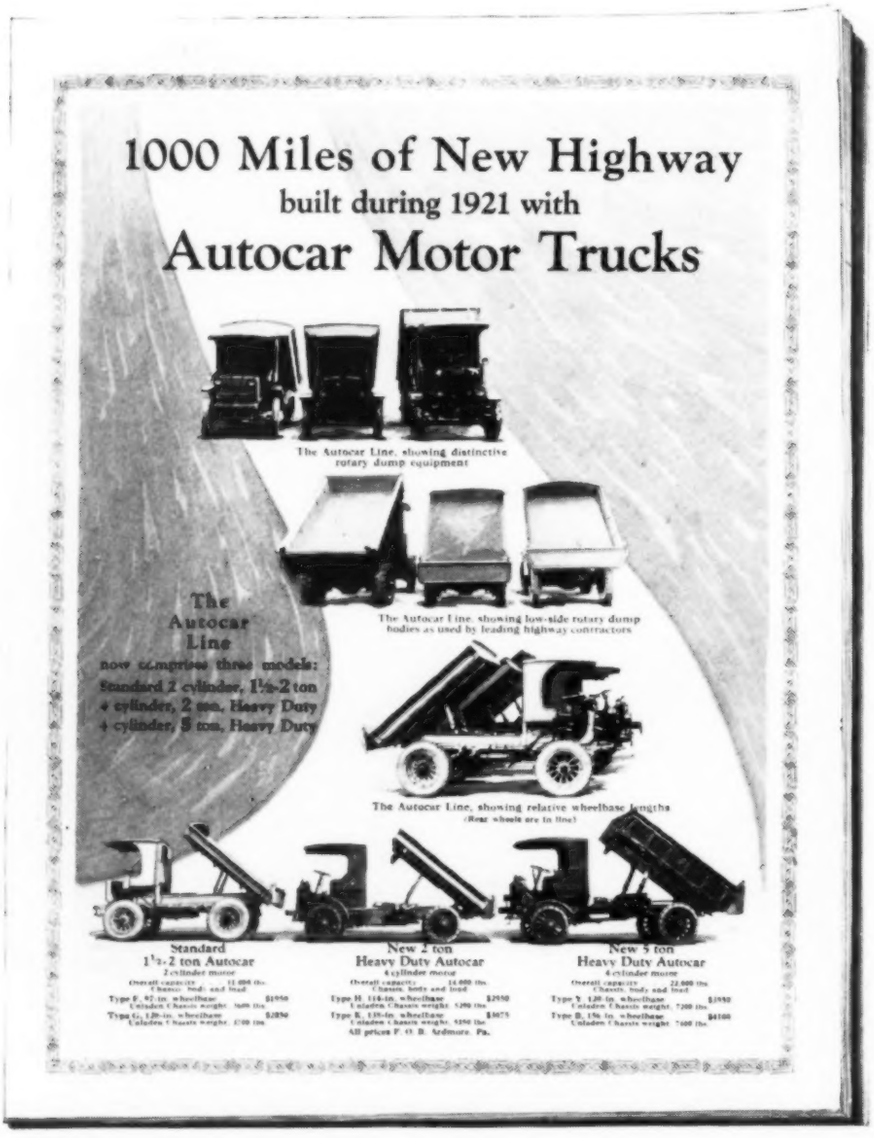
Successful Methods

Construction - Road Making - Engineering - Industrial - Mining



Vol. 4. May 1922 No. 5

Time Saving in Highway Building
Illustrated and Described



This new booklet contains the names of hundreds of successful contractors and information concerning the road-work they did during the 1921 season.

It shows also that short wheelbase Autocar Motor Trucks are standard equipment with leading highway contractors in all parts of the country.

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Successful Methods

A Magazine of Construction Service

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Prices

LATE last year we ventured the opinion in these columns that many contracts were being let at prices which would show a loss to the contractor. We went so far as to predict that wages and materials would go up instead of down.

Some of our friends told us we were off on a tangent. A few of them were quite sarcastic in their remarks. One city engineer in Kansas wrote us that our ideas on the subject were pure bunk. He even intimated that we had an axe to grind.

Far be it from us to say we told you so. It has come out lately, however, that a lot of contractors are in over their eyes on jobs taken last year. One state highway commission frankly is worried about the completion of several contracts awarded at very low unit prices. Nor is the difficulty confined by any means to highway work.

Meanwhile prices in some lines of materials are hardening appreciably. Steel prices are up considerably from the low mark of January. Some other material prices are beginning to demonstrate that the law of supply and demand still controls them. The average price of ten basic commodities was, in fact, 9 per cent higher on April 1 than on last August 1. A continuance of this advance may be expected as general business improves. This advance also is certain to be reflected in material prices and in labor rates in sections where unions have not prevented wage deflation in line with the drop in other prices.

Probably there will not be a boom. Heavens knows none of us wants one. But it will be wise to watch the sky these next few months. It will be better to lose several jobs on price than to get one at figures that rising costs may turn into a loser.

School Boy Inspectors

EARLY next month the annual crop of school boy inspectors will appear. All over the country boys fresh from college who know practically nothing about construction work will be placed as dictators on jobs of every kind. Practically all these boys are honest. They have the best intentions in the world. They are all short on just one vital qualification—experience.

This annual fiasco has gone on since the memory of man runneth not to the contrary. Most contractors believe there is no hope of avoiding the handicap such inexperienced inspectors put on their work. They look on the coming of these school boy engineering authorities as they do on late frosts, floods and droughts. Acts of God—inevitable—anything you want to call them. Only use plenty of language.

Most engineers appreciate the situation. Generally their hands are tied by a lack of sufficient funds to hire competent, experienced inspectors. There are, however, many notable exceptions. Too often engineers take the attitude that the inspector must be a parrot on the specifications. He must say and do what he is told. He can be trusted to exercise very little judgment; and, in too many cases, that unfortunately is true.

Sooner or later engineering societies will get down to earth in more of their deliberations. They have come a long way in the last 20 years from their pinnacle of "pure science" of the old days. One of the bed rock subjects they will consider before long is the elimination of incompetent and inexperienced inspectors. May Providence speed that day.

Beyond the Limit

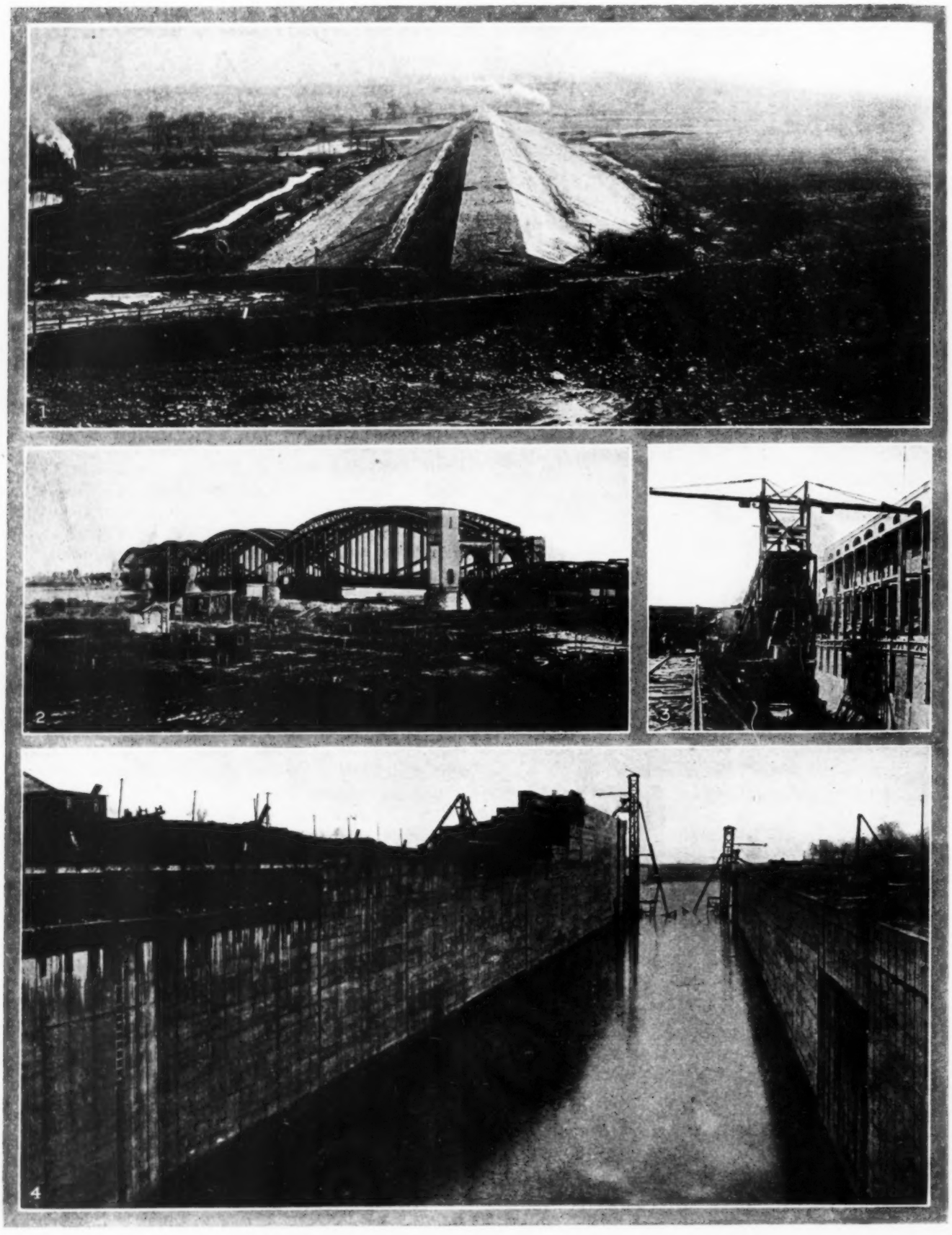
THE other day a paving contractor in one of the Southern States started to move a paving mixer from one set-up to another. En route the machine had to go up about a 12 per cent grade for several hundred feet on a detour required by a light bridge. About half way up the transmission gears were stripped. Everybody on the job cursed the machine and its builder. A second paver of another make was hurried to the job. On the way up the grade the main clutch on that machine let go.

After three days' delay repairs for the first machine arrived by express. A 22-hour session for 9 men put the paver on the job the fourth morning just as a three-day rain started. The net result was the loss of six working days.

If the foreman had taken two or three hours to remove the boom and bucket, and probably the charging skip, either machine would doubtless have climbed the long, steep grade. The failure of the gears on the first paver only convinced him that the machine was no good. He tried to push the second machine beyond its limit, and he lost.

All over the country men persist in asking machines to work far beyond capacity. They boast of such stunts as putting a 15-ton load on a 5-ton motor truck. Then they wonder why good machines fall down occasionally. It does not pay. Machines have their limits. To exceed them simply shows poor judgment.

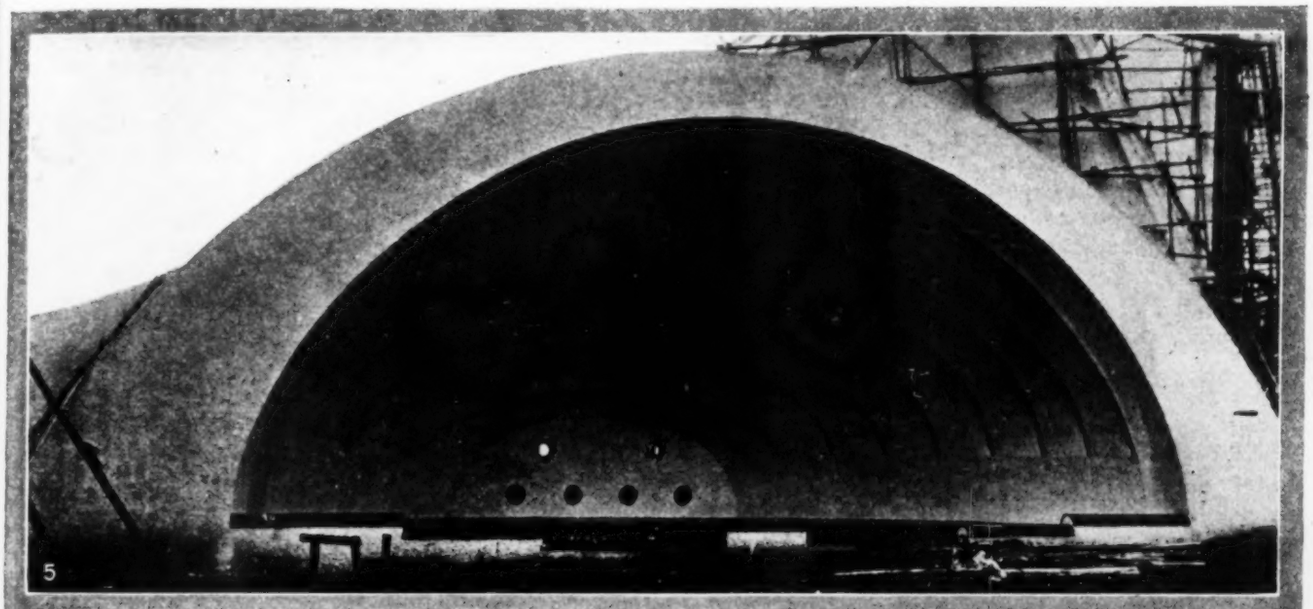
Work for the Builders

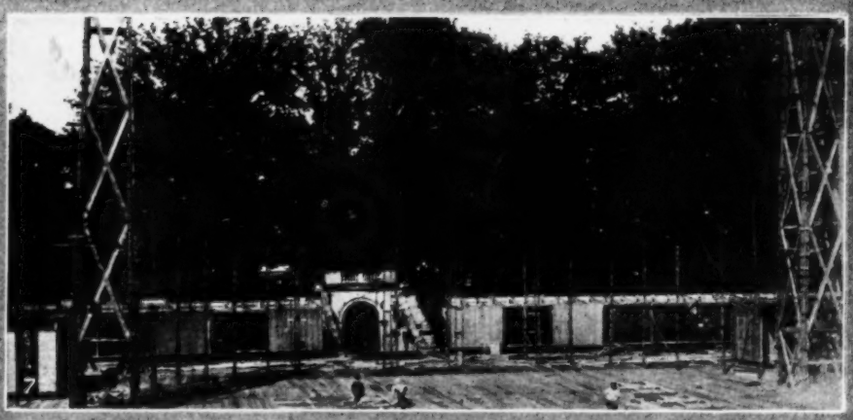


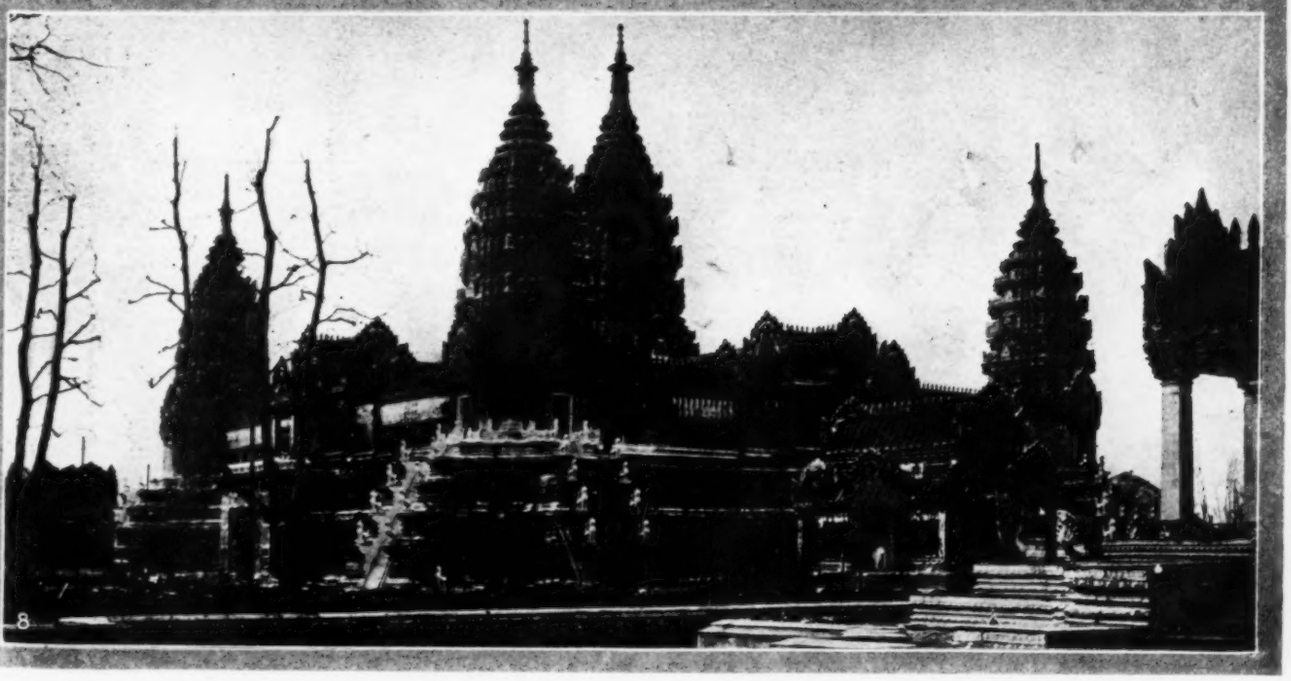
No. 1—This photograph shows the great bulk of the Huffman Dam, near Dayton, Ohio, one of the units of the gigantic Miami Conservancy Project. © *International*

No. 2—An example of German bridge building. This structure crosses the southern Elbe. © *Keystone Views*

Buildings for the Players







No. 5—An open-air music hall built in Tokio, Japan. Bamboo is used for the skeleton of this building. © *International*
No. 6—Getting ready for spring in St. James Park, London, by painting the bandstand and preparing it for the concert season. © *Keystone*

EFFICIENT PILE DRIVING SPEEDS WORK

Foley Brothers of St. Paul, Minn., Are Handling Pier Job in Hudson River

DOWN from St. Paul, Minn., came Foley Brothers, general contractors, to rebuild one of the piers of the Erie Railroad in Weehawken, N. J., which burned in the summer of 1921. This pier is in the Hudson River, about opposite Twenty-third Street, New York City. Along with the pile-driving crews who have had much experience in building the huge grain terminals and ore docks of the Great Lakes, the Foleys brought their equipment and are using their own methods in driving 4300 new piles which will carry a two-story shed.

The pier will be 100 ft. wide by 832 ft. long, which is an extension of 112 ft. beyond the limit of the former pier. The old piles, of which there are about 3500, will be sawed off and used with the new piles. Caps, 12 by 12, will carry a solid 6 by 12 splined deck. On top of the deck a 5-ft. earth and cinder fill will be placed, which is to be a protection for the substructure. In case of another fire, the sheds would simply burn down to the earth fill and the substructure would remain intact.

Two types of drivers, each of which has unusual features, are used. On has 65 ft. and the other 60 ft. leads and both handle sticks up to 85 ft. in length. A follower block, which is shown in one of the illustrations, is a cup-shaped steel casting which fits over the head of the pile and also into the guides of the leads. It is a time-saving device and is used to protect the heads of the piles and keeps them from springing out of the leads. The hammer weighs 3600 lb. and the follower block 1200 lb. Each driver is equipped with an 8¼ by 10 double cylinder double drum 40-hp. hoisting engine.

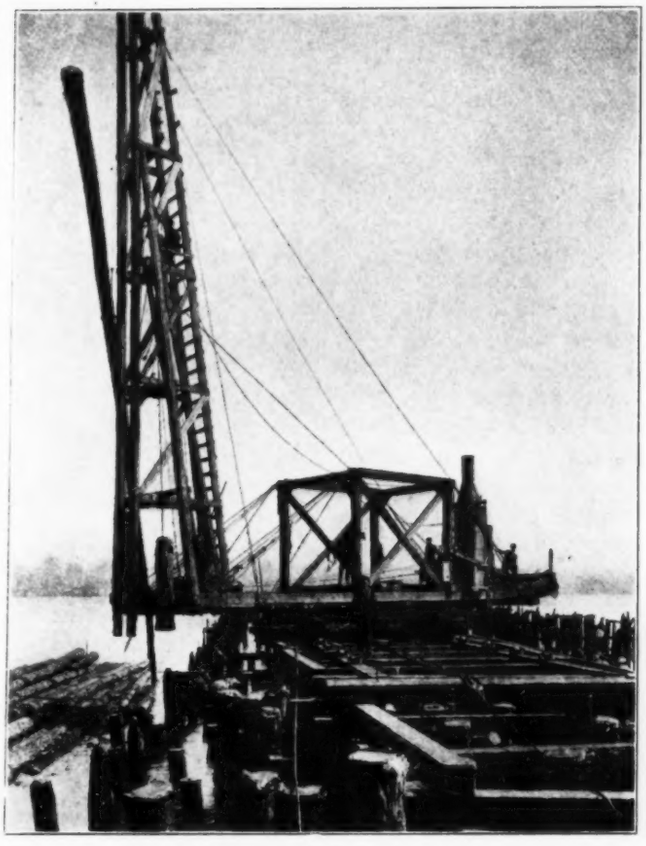
One of the drivers is enabled by means of a turntable to swing a full 360 degrees and also to travel backward and forward on steel dolleys. This machine has a working diameter of 54 ft. and covers half the width of the pier. The other driver, at first glance, seems too light to handle the 85 ft. sticks, but it is of steel construction and has a record of putting down 100 piles in eight hours. This is a skid machine of simple construction, with 60-ft. leads pivoted in such

THIS ILLUSTRATION SHOWS THE FOLLOWER BLOCK IN POSITION ON TOP OF PILE. THIS DRIVER CAN SWING 360 DEGREES AND ALSO TRAVEL BACKWARD AND FORWARD RAPIDLY

a manner that they can be tipped to an angle of 45 degrees to drive the spur piles.

L. B. Fulton, who is superintendent for the contractors, and who has probably had as much pile-driving experience as any man in this country, is authority for the statement that the drop hammer, as he is using it, is capable of doing faster work than a steam hammer; in fact, unless quicksand is encountered, the drop hammer is to be preferred in all cases to the steam hammer.

On the outer edge of the pier there is to be a concrete wall, the foundation of which is made up of blocks (1-2-4 concrete) precast in order to allow them to cure sufficiently to resist the action of the salt water. The ordinary two-story frame construction zinc-covered pier shed is to be constructed on this foundation. Work on the pier started Feb. 24. Since that time an average speed of 115 piles with both drivers have been made per day. Each driver has a crew of eight men.



HANDLING AN 85-FT. PILE

The photograph on the cover of this issue of SUCCESSFUL METHODS shows both drivers at work. The driver shown on the right is the steel skid machine and is in the act of picking up an 85-ft. stick. This machine is of simple construction and can be taken down and set up in a short time.

In the background the stubs of the old piles of the burned pier may be seen. The presence of these old piles made it impossible to use marine pile drivers on the new piles which are spaced among the old ones. For drilling holes for bolts and for driving drift bolts, compressed air is used exclusively.

Inasmuch as the piles used come from the South, great care is taken to guard against piles which have been innoculated with the teredo or marine borer. Every pile is carefully inspected and all showing any trace of the pest are thrown out. The work of inspection takes a little more time, but the results justify it.

SIDE LIGHTS ON THE BIG NEW YORK AND NEW JERSEY VEHICULAR TUNNEL

Contract let to Booth & Flinn, Inc., for $19,331,723.00, the largest sum ever paid for a single engineering contract.

Total cost of tunnel will exceed $28,000,000.

Total length of tunnel 9,250 ft., of which 5,480 ft. will be under the river.

The tunnel will have an outside diameter of 29½ ft., and will be the largest subaqueous tube to be built by the compressed air shield method in the United States.

The contractor is required to furnish bonds to the total amount of $4,000,000.

Time allowance is 36 months with a $1,000 per day penalty cost for delay.

There will be two air compressors; one on the Manhattan shore and one on the New Jersey side, each having a capacity of 3,500 hp. or 30,000 cu. ft. of air per minute. Only one plant will be required to be built however, as Booth & Flinn already own the plant used for excavating part of the 14th Street subway and the possession of this apparatus is one reason why Booth & Flinn were able to underbid other competitors.

Six shields are to be used in driving the tunnel and are now being manufactured by the Merchants' Shipbuilding Company at Chester, Pennsylvania. The shields weigh 300 tons apiece and will be taken down in sections and set up below.

Thirty-nine jacks will be used in forcing the shields ahead at the rate of from 2½ to 15 ft. per day. The jacks are placed on the outer edge of the shield and thrust forward with a power sufficient to move 7,600 tons.

After a year of delay, the contract was awarded on Tuesday, March 28, executed by the Commission on Wednesday, executed by the contractor on Thursday and work started on Friday.

Sixty parcels of land, costing $1,700,000 on the Manhattan side for entrance and exit plazas have been acquired.

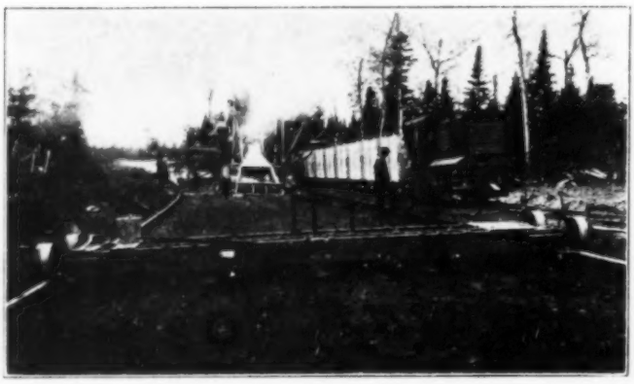
Clifford M. Holland is chief engineer for the New York and New Jersey Tunnel Commissions.

OPENING UP THE IRON COUNTRY

Two Contractors on Adjoining Sections Use Same Methods in Building Minnesota Road

By C. P. Burton

THE modern methods which have revolutionized concrete road construction, namely, the central proportioning plant with industrial railway haulage, are well illustrated in the paving of the Miller Trunk Highway, now in progress, from Duluth to Eveleth, Minn. This is an important project as the road will be the main highway into the great Mesaba Iron Range.



THE JACOBSON PAVING PLANT—SUBGRADER, MIXER AND TRAIN BATCH-BOXES

The entire 60 miles are under contract and will be completed before the close of the year. Jacobson Brothers & Company of Duluth are building 15 miles of the pavement, leading north from Duluth to a point 4 miles above Twig, a station on the Duluth, Winnipeg & Pacific Railway. Grant Smith & Company of St. Paul are building 13 miles south from Central Lakes, on the same railroad, toward Twig.

Both of these concerns, each working independently, are handling their work in much the same way, differing only in some of the details. Each is building from a central proportioning plant. Each is using oak batch-boxes of the bottom-dump type, the former 37-ft. and the latter 33-ft. capacity.

The unloading and proportioning plants of Jacobson Brothers & Co. are at Twig, 4 miles from the north end of the contract. Industrial trains will run both ways from this plant for a distance of 4 miles; in fact, one 4-mile stretch of pavement was finished last year. That leaves 7 miles to be paved at the Duluth end of the contract. During the winter the contractors stock-piled material at a point midway of those 7 miles, and industrial trains will run both ways from there during the rest of the work.

A steamshovel equipped with a ¾-yd. clamshell bucket is being used successfully at the unloading station, unloading an average of 10 cars of material a day. The superintendent considers it faster than a derrick.

Grant Smith & Company set up its proportioning

GRADING ON THE JACOBSON CONTRACT WITH FRESNO AND TRACTOR.

A RATHER UNUSUAL TURNOUT ON THE GRANT SMITH JOB.

plant at Central Lakes, the extreme north end of the contract, and succeeded in laying nearly 4 miles of pavement last fall. At the 6-mile point or about midway of the contract, small bins and cement houses will be erected, to which material will be hauled in large auto trucks from the unloading plant. The trucks will run up on a trestle and dump directly into the bins. Trains of bottom-dump batch-boxes will be loaded under the bins in the usual way and hauled to the mixer.

The work is being organized with the idea of sending a batch out from the plant every minute. If there is any waiting to be done, it will be at the plant and not at the mixer. Four trains are used. Two will be on the road while one is at the mixer and one at the plant. Spotting at mixer and plant is by team.

The bins at Central Lakes are on rollers and material is unloaded by a stiff-leg derrick, also on rollers. This derrick has a boom 80 ft. long made of two timbers, each 40 ft. long. These timbers were butted together and trussed with four 1⅛-in. truss rods, the truss-rod spreader holding the joint in place. Steel mesh for reinforcing is handled on the material trains, and gasoline is used for fuel in both locomotives and mixer. On the Jacobson contract a car of coal is attached to the rear of each material train and the mixer supplied from that, thus insuring a constant supply of fuel.

FIRST STAGE OF ILLINOIS TESTS FINISHED

THE first stage of the test conducted by the Illinois Division of Highways on the Bates Experimental Road, 12 miles southwest of Springfield, resulted in only corner breaks on the rigid sections of pavement. No large transverse or longitudinal cracks appeared.

This first stage of the test consisted of 1000 round trips of trucks stripped to chassis and cab so that the load on each rear wheel was 2500 lb. and on each front wheel 2250 lb. This corresponds to a nominal load of 250 lb. per inch of width of rear tire and 450 lb. per inch of width of front tire.

The trucks made regular trips up one side of the road and back on the other side over the 63 sections of which the 2-mile road is composed. They moved at a constant speed of 15 miles per hour. Guide lines painted near each side of the pavement held the trucks to a straight course, so that the center line of travel of the outside rear wheels was 6 in. from the edge of the pavement on all sections except those having macadam bases. On some of the other kinds of pavement the failure was much greater, and in the case of the corner breaks above mentioned there were indications that they would be quickly followed by progressive failure of the adjacent pavement.

On the second stage of the tests the weight will be increased, the rear wheels of the trucks carrying 3500 lb. and the front wheels carrying 2300 lb. As was the case with the first stage, one thousand round trips will be made. It is expected that this heavier load will do much more damage than was the case when the stripped trucks were running.

MAKING TRUCKS DO FULL DUTY

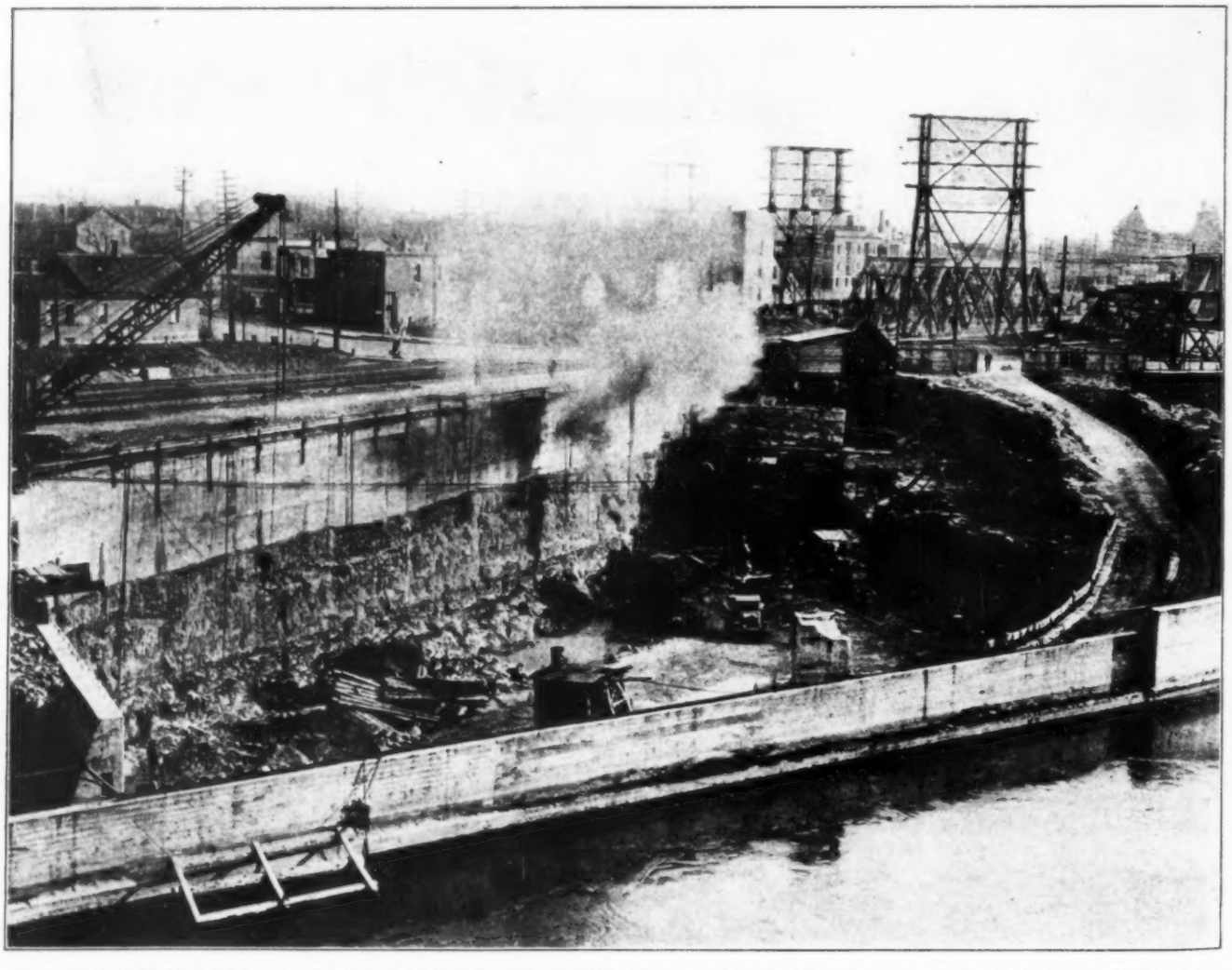
Contractor Plans His Layout to Reduce Wear and Tear to a Minimum

MOTOR trucks now play such an important part in modern construction work that in designing the plant layout for large contracts consideration must be taken of all possible means to decrease the abuse to which the trucks necessarily must be subjected. The Read-Coddington Engineering Company, on its Niagara Falls Power Company job, has taken all possible precaution to save its trucks with a considerable saving of time and fuel.

The project calls for the excavating of a 4300-ft. tunnel or underground aqueduct to convey water from Niagara River, above the Falls, to the company's power house under the City of Niagara Falls; a fan-shaped inlet in the river and a rectangular outlet 170 ft. by 240 ft. with vertical walls.

Work was started first on the outlet excavation and this operation called for a vertical cut of 80 ft. and a means of shoring the railroad tracks on one side and taking care of the canal on the other. To shore up the 20 ft. of top soil upon which the railroad tracks rest, a concrete retaining wall 8 ft. thick at the bottom was built. The work of excavation was then begun.

A cut 10 ft. deep and wide enough to permit the operation of a steam shovel was blasted parallel with the retaining wall about 40 ft. distant from it. After this trench was cleaned out by the shovel a row of holes was drilled along the edge of this trough on the side toward the retaining wall. A shot was then made in such a manner that the force of explosion forced the débris into the cut already made. In the same manner succeeding slices were blown out with lighter charges until the edge of the retaining wall was approached, where drill holes were placed only 6 in. apart and very light charges of powder used so that the rock was split with little shaking of the concrete. The excavating equipment for this part of the work consisted of a small steam shovel, 7-ton locomotive crane and between 20 and 30 air drills. A 20-ton locomotive crane also operated from the top of the concrete retaining wall on the railroad side of the pit. An average of ten 5-ton trucks with 4-yd. dump bodies served the shovel and cranes.



THIS PHOTOGRAPH SHOWS THE STEEP CLIMB WHICH THE TRUCKS MAKE, AS WELL AS THE CONCRETE RETAINING WALL WHICH COMPLICATED THE BLASTING PROBLEM

THE GEAR SHIFTING LEVEL DESCRIBED IN THE ARTICLE MAY BE SEEN AT THE RIGHT SIDE OF THE PHOTOGRAPH

On account of the difference in hardness of the rock in the various strata, the speed of handling the excavation varied greatly. The first limestone encountered was so solid that pieces too large for the shovel to handle effectively had to be handled by the crane which dropped the large boulders on motor trucks. An idea of the difference in solidity of the rock may be gained from the fact that in some levels 1.9 lb. of dynamite was used per cubic yard, while in others .6 lb. was found sufficient.

One of the illustrations shows the ramp which was built with several different rates of incline. To climb out of the pits the trucks ascend a short grade of 20 per cent. This is followed for a short distance by a 12 per cent grade, which levels out for 30 ft. into a grade of only a few per cent. This enables the driver to shift from low to second gear preparatory to the final 250-ft. climb of 10 per cent grade. By means of this gear shifting level a truck is enabled to gain sufficient headway to make a fast ascent with a smaller expenditure of fuel.

To help the trucks take the severe punishment to which they are subjected, such as being loaded with a jagged boulder weighing over five ton and having the boulder bunted ahead to place by the shovel, steel rails were placed in the body of the truck, which take the impact of the floor as well as aid the placing of the loads in the forward part of the truck body.

Other practical ways for speeding the truck work were tried out and found helpful. For instance, by means of piling the load in the forward end of the body tail gates were found unnecessary. This eliminates the time of fastening or unfastening the tail gate locks and also does away with the danger of the steam shovel damaging the tail gate. A checker, whose business it is to check the loads by means of wooden pins which he plugs into a board, also "trims" the load before it starts on its journey. This "trimming" is accomplished with a few strokes of a shovel and requires only a few seconds. As a result, scattering of loose parts from the load on to the ramp is reduced to a minimum.

Mr. Read was questioned as to whether or not he would use a similar method and use trucks another time, and his answer was that after six months' trial he had added five additional trucks to his fleet.

RELOCATING THE MOHAWK TRAIL

UNDER a photograph of the Mohawk trail, which appeared on page 11 of the April issue of SUCCESSFUL METHODS, it was stated that this famous road was in Michigan. This error has been pointed out by several readers and SUCCESSFUL METHODS takes pleasure in putting the Mohawk trail back where it belongs in the Commonwealth of Massachusetts. It is such a splendid road that no doubt should be allowed to exist as to its location, and Massachusetts deserves all the credit.

A PERUVIAN IRRIGATION PROJECT

Machines from the United States Are Building Tunnels and Ditches on Well-Organized Work

A GREAT irrigation project conducted by the Peruvian Government and built with machinery from the United States is now nearing completion. In Peru the nature of the country is such that irrigation is vital. Even in the time of the Incas it was the basis of agriculture, and only the more primitive tribes lived outside the regions which were artificially watered. Therefore the whole subject always has been regarded as one of great importance.

The project now under construction is known as the Canete project and is situated about 92 miles south of Lima. The area to be irrigated is known as the Pampas Imperial, and when completed approximately 18,500 acres of land will be made available for agriculture. At present about 34,600 acres of land in the Canete River valley are irrigated and the new work will add to this territory. In the past the general practice has been to carry the water around the hills and through the valleys in open ditches, but in the new development the Canete River has been tapped at a much higher point than in the past and the water is to be carried through the intervening hills by a series of tunnels. The distance from the intake to the 230-ft. fall above the Pampas Imperial is about eight miles.

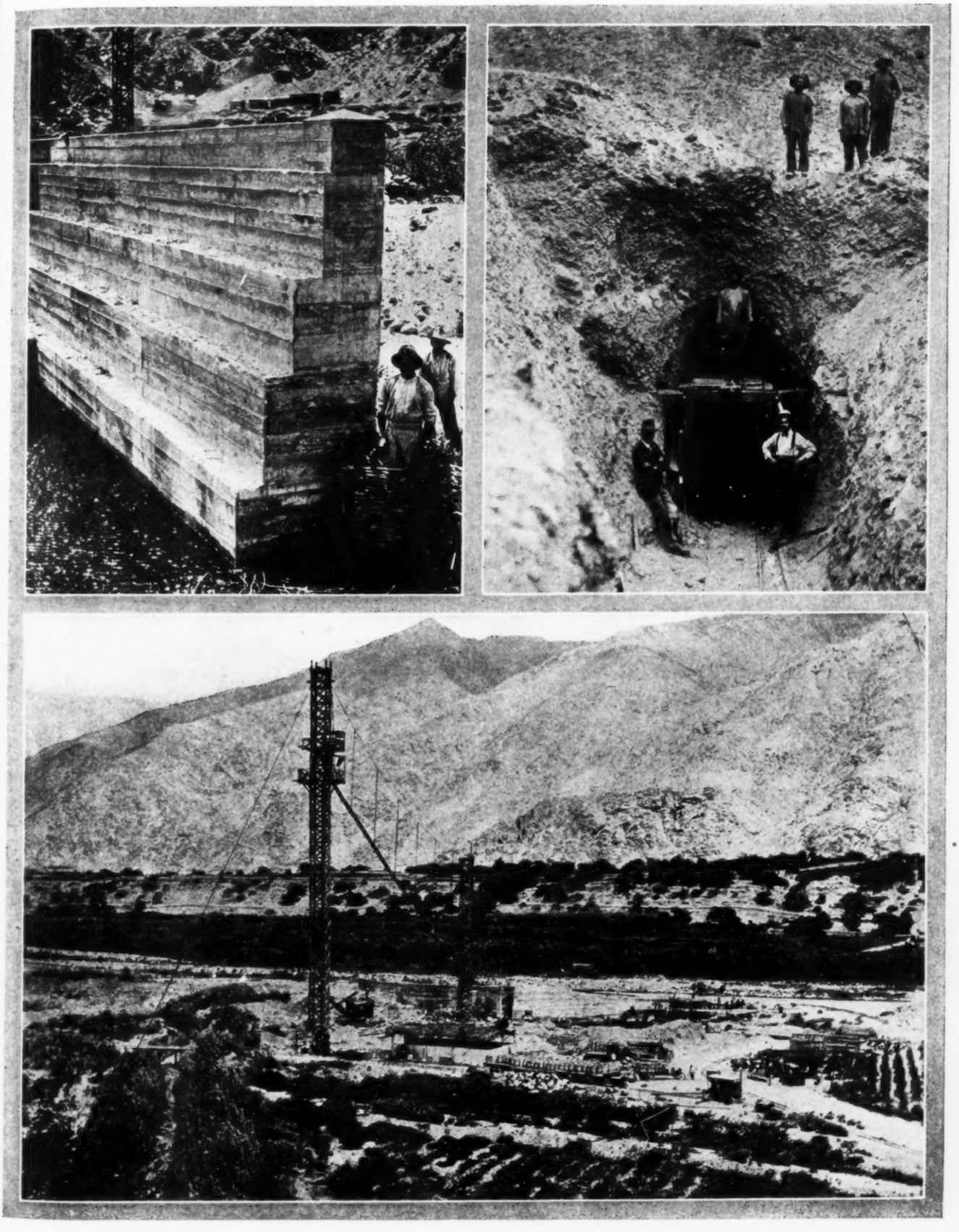
The water will be distributed over the pampas by means of 15 miles of open ditches. In the 8 miles from the intake to the fall there will be 9 tunnels, the total length of these tunnels being 14,750 ft. These tunnels are lettered from the intake to the fall A, B, C, D, E, F, G and H. Tunnel H is 8430 ft. long.

One reason for tapping the stream so high is that it will be possible to develop hydro-electric power, and this is expected to be of great help to the many small industries in the valley below and may result in a considerable development of new industries. The hydro-electric plant has not been provided for in the existing plans, but it probably will be built in the next few years. It is estimated that a hydro-electric plant established at the fall would be able to deliver 5000 hp. in the dynamo coils.

The project was authorized May 7, 1920, and work was begun in the fall of that year. It was organized and directed by C. W. Sutton, who has spent con-

THIS PHOTOGRAPH SHOWS THE OPEN DITCH BETWEEN TUNNELS C AND D

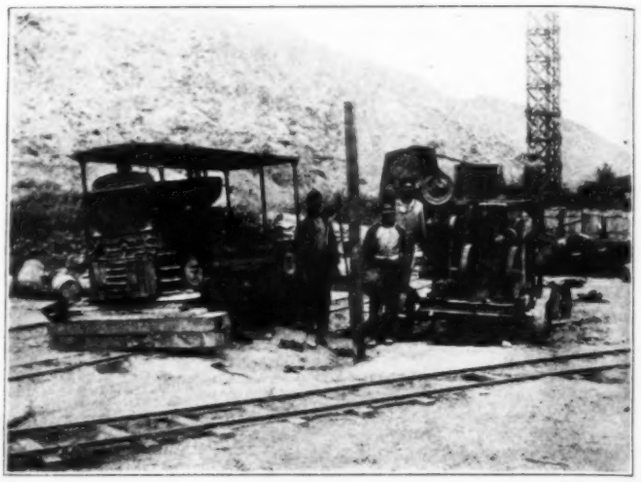
Putting the Water Through

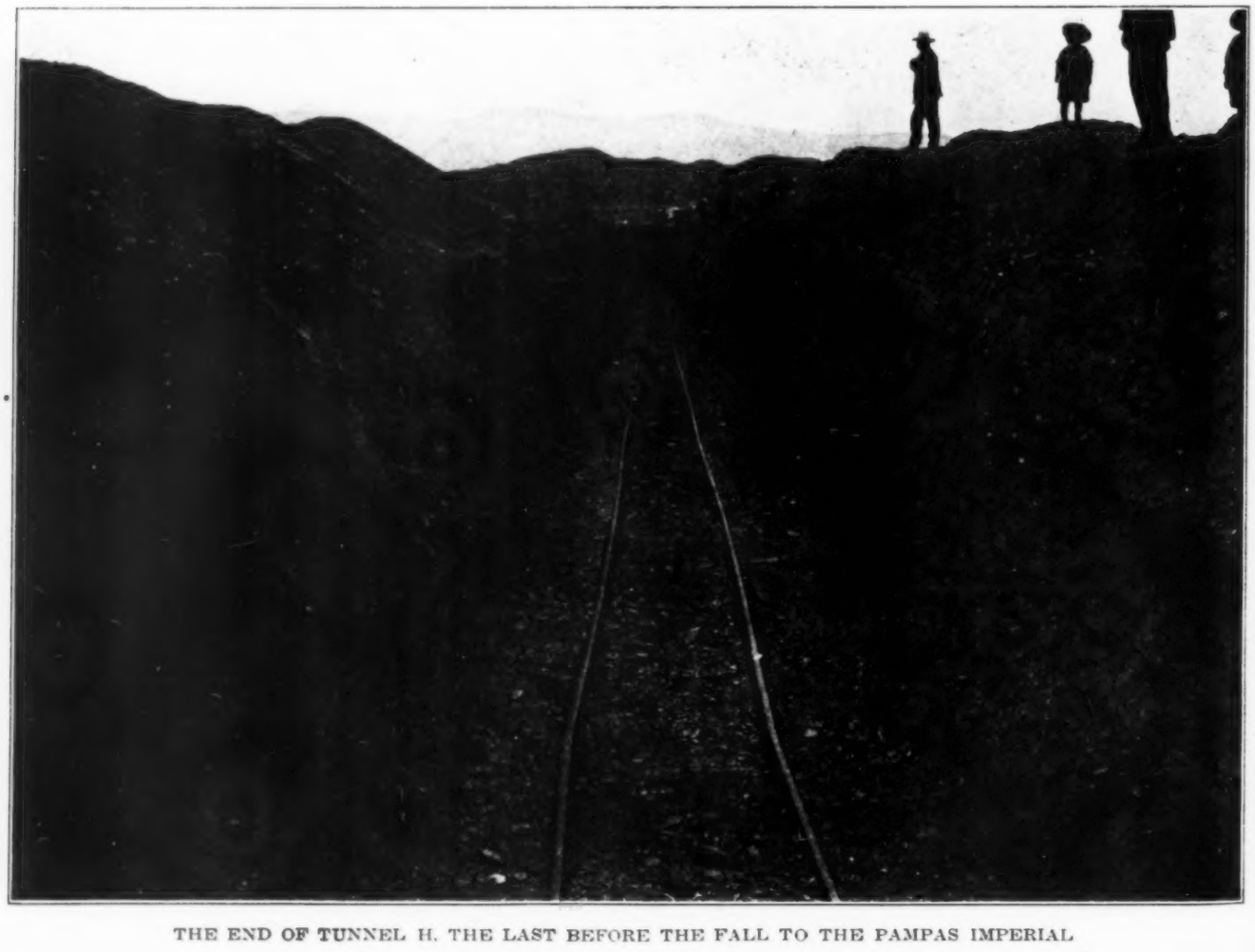


Upper Left—Protecting a recently completed structure during the flood season by the use of basket cribs woven by the laborers and sunk into position by weighting them down with stone.
Upper Right—The portal of one of the nine tunnels through the mountain range.
Bottom—A general view of the chuting plant made in the United States and shipped to Peru.

siderable of his time in developing Peruvian irrigation work. E. Torres Belon is the resident engineer and there are more than 5000 employees. Twelve working camps have been established, numbered in order from the fall to the intake and 8½ miles of roads have been constructed to reach the various camps. Practically all of the machinery came from the United States.

The labor problem always is a troublesome one in Peru, and it has been solved on this particular job in an effective fashion. At the time work was begun, it was decided that by adopting a wage scale higher than that prevailing in the Canete Valley considerable hostility would be created among the users of labor in the valley, and to avoid this difficulty the labor was imported from other parts of the country, leaving the working forces on the plantations intact. The quarters for the men were provided free of charge and a small amount was deducted from their pay for the food provided, which was of better quality than usually found on such work in South America. The men seemed to like this arrangement.





THE END OF TUNNEL H. THE LAST BEFORE THE FALL TO THE PAMPAS IMPERIAL

WHICH IS THE DANGEROUS ROAD?

The Maryland Road Commission Statistics Show That More Accidents Occur on the Straight One

By H. D. Williar, Jr., Assistant Chief Engineer.

THE question of accidents on the State highways has been given careful consideration by the Maryland State Roads Commission during the last year. The commission has adopted the policy that in addition to the ordinary maintenance, special attention will be given to the elimination of danger points on the roads and thus reduce accidents to a minimum.

With this feature in view, a system has been worked out whereby every accident occurring on the State Road System is reported daily and represented by a colored tack on a large map in the office of the chief engineer. A study of this map intelligently shows the points or sections of roads which need immediate attention. It has established forcibly points where accidents are frequent which otherwise would have been considered safe. It has demonstrated conclusively that "the most dangerous places are frequently the safest," and it has further shown that 70 per cent of our accidents occur on straightaways rather than on curves. The only answer to this conclusion is—speeding.

ONLY FOUR ACCIDENTS OCCURRED IN FOUR MONTHS ON THIS WINDING ROAD

With this information at hand, Maryland has been able to improve its roads to the highest advantage, and the accident record is proving a source of invaluable information. To cite specific examples, it may be well to consider two stretches of road, one between Baltimore and Frederick and the other between Baltimore and Belair. Both of these roads are old water-bound macadam and carry approximately the same volume and kind of traffic, which is about 4000 vehicles per 24-hr. day.

The Belair Road was widened several years ago from 14 to 20 ft. because it had numerous curves and was considered dangerous. On this road, during the months of May, June, July and August, 1921, there were four accidents, none of which were fatal.

The Frederick Pike, one of the straightest roads in the State, was 14 ft. wide for its entire length, and prior to the keeping of the accident map was considered safe. On this road during the months of May, June, July and August, 1921, there were 36 accidents, 3 of which were fatal.

The answer to this comparison is evident. It demonstrated that on the straight road there was a strong tendency to speed and that widening was necessary and urgent. It showed conclusively that fast traffic had completely outgrown the width of the road. A contract was immediately entered into for its widening to 20 ft. by constructing 3-ft. concrete shoulders on each side of the old macadam. The record, since this work has been completed, shows a reduction in accidents of 75 per cent.

THIS STRAIGHT ROAD PRODUCED THIRTY-SIX ACCIDENTS, THREE OF WHICH WERE FATAL, DURING THE SAME FOUR MONTHS

The photographs on this page show the two roads which are compared in the preceding paragraphs. At first glance the straight Frederick Pike appears to be the safest sort of proposition and the curving Belair Road looks like a veritable trap. But that is just the reason why the straight road produces the accidents. It looks too easy.

A PROTEST FROM ARKANSAS

IT is not often that anyone rises to protest that a mistake has been made when the result of the mistake is to pass the buck to someone else.

On page 2 of the April issue of SUCCESSFUL METHODS appeared a photograph of a Ford car hopelessly mired in a country road and under the picture was a caption saying that the road shown was somewhere in the East.

According to W. J. Parkes, manager of the Parkes Engineering Company of Pine Bluff, Ark., the road shown isn't in the East at all, but is 4 miles north of De Queen, Ark. Probably Mr. Parkes would not be so anxious to call attention to the error were it not for the fact revealed by the lower photograph on the opposite page. Here is the way in which Mr. Parkes tells his story:

Gentlemen:

"On the second page of your April issue appears a photograph of a Ford car imbedded in the mud, with a statement that the East is responsible for the road in question.

"As a matter of fact this photograph was taken at a point some four miles north of De Queen, Ark., about 5 years ago by a local photographer. The gentleman with the harrassed expression standing by the side of the car is Mr. Elson Hale, one of our supervising engineers.

"We inclose a second photograph of the same spot, taken a few months later than the one which you published. You will note that the car and the persons are the same, and the locality can be further identified by the mail box and telephone pole in the distance, as well as the nearby picket fence. In the interval between the times at which the two photographs were taken, Road Improvement District No. 1 of Sevier County had constructed an excellent road of local gravel, as is shown by the second photograph.

"The Parkes Engineering Company designed and supervised the construction of this road, which is about 25 miles long and extends north and south through Sevier County, Arkansas. You will note in the second picture that Mr. Hale is looking at a copy of the photograph which you reproduced in your April number, and is smiling with gratification at the change which has taken place under his supervision. The lady in the car is Mrs. Hale, and her placid expression in both pictures indicates that at no time had she any doubt of the final accomplishment of the improvement made under her husband's direction.

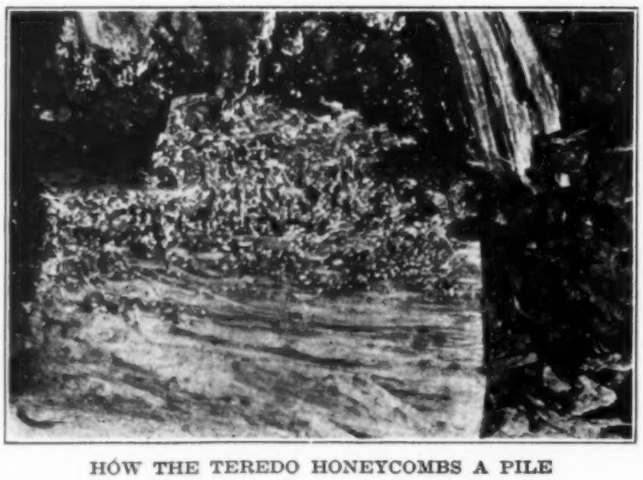
Another reader of SUCCESSFUL METHODS who evidently believes that the roads in his state (which does happen to be in the East) can stand improvement, tore out page 2 from his April issue and marked on the photograph of the imbedded Ford, the words, "This must be ——* for it certainly looks like home."

*Editor's Note.—Name of state furnished upon request.

WHAT THE TEREDO CAN DO

THE illustration shows a teredo-eaten pile which was shipped from Southern waters for use in the construction of a new pier in New York Harbor and illustrates the way in which a pile may be thoroughly honeycombed in the short space of a year's time, even before it has a chance to be used for the purpose for which it was intended. The teredo is a worm-shaped grayish white animal which infests salt water and does damage to ships and submerged wood by perforating them. It is supposed to have been originally imported from the tropics, but it has now become an inhabitant of most harbors. In the Harbor of New York the teredo is unknown on account of the immense quantity of acid and sewage.

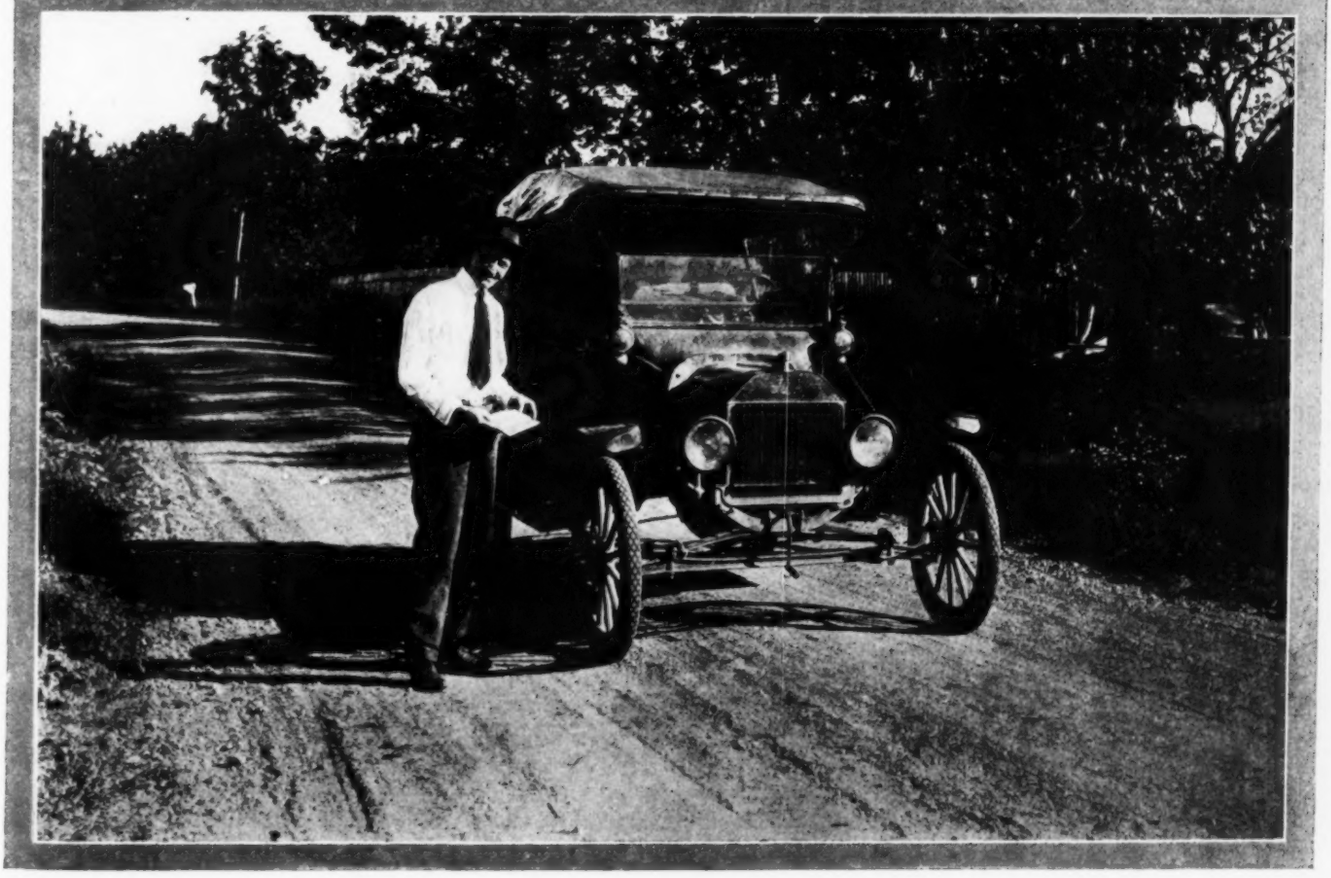
In piling the worm generally starts at the juncture of the water and the ground line and innumerable methods are now being tried out to combat it. Creosote was supposed to be effective against this worm, but in certain instances where treated piling was used on the Pacific Coast the creosote proved a treat to the teredo instead of to the piles, and in many cases the piles were practically eaten up in a comparatively short time. Among the methods used to prolong the life of wooden piles is the envelopment by precast concrete segments so as to be interlocking when set in place.



HOW THE TEREDO HONEYCOMBS A PILE

Another contractor has developed a method of placing a monolithic coat around the pile. A sheet metal form is placed around the pile and slime and loose material are forced out by means of air pressure. The form is then forced down to a clean bottom and concrete tremied to place. The concrete is lowered through a canvas tremie by means of a bucket with a valve in the bottom to allow the concrete to flow out and settle around the wood pile. The canvas is gradually withdrawn and the concreting is carried on, making the placing of the concrete continuous. The mixture is one part cement, three parts sand.

Before and After



The lower photograph shows why Arkansas insists on being recognized as the owner of the road shown in the upper picture. **See opposite page for details.**

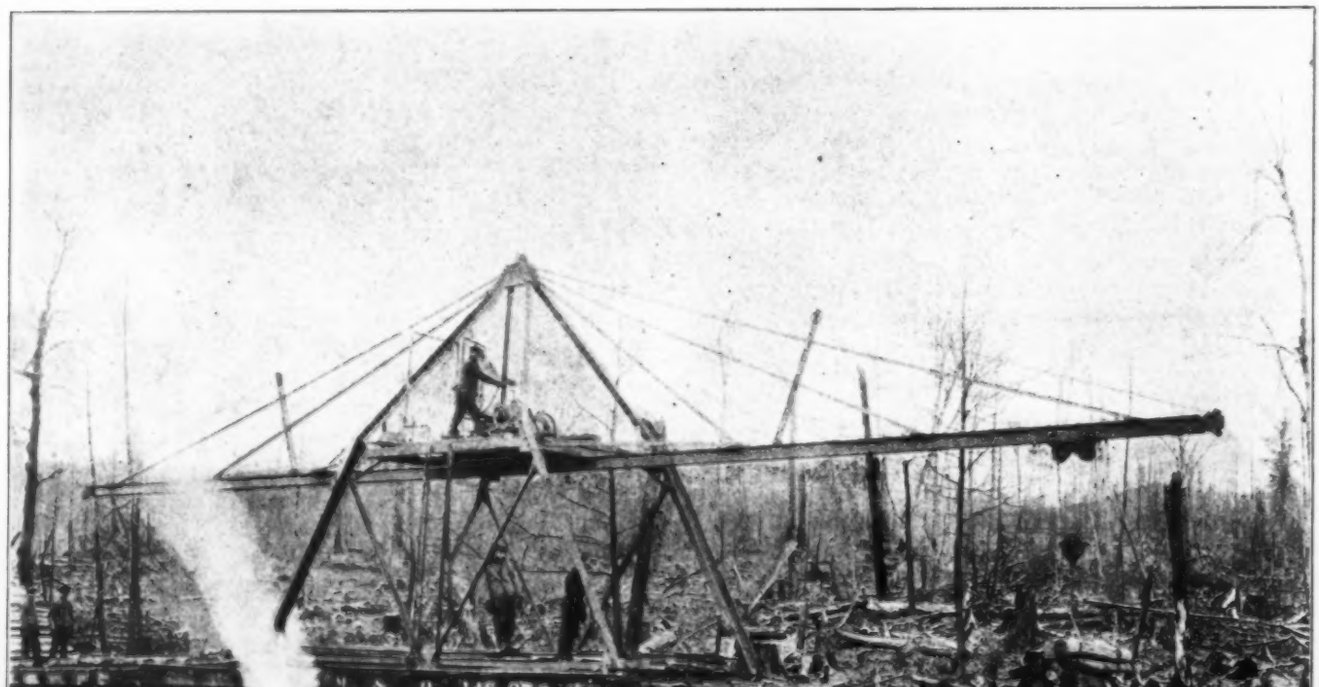
TRACK LAYING ON LOGGING ROAD

Machine Replaces Manual Labor and Saves Time and Money

STATISTICS show that during the years 1920 and 1921 more miles of railroad track were taken up than were laid. This statement, however, applies only to class A and class B railroads, and does not take count of the vast amount of standard gage track laid each year for logging purposes, which totals greater mileage than all other new railroad mileage combined.

Laying or taking up of railroad track by hand is a strong-arm job, which causes fatigue to such an extent that the sacrifice of speed is enormous. The extent of this kind of work in logging operations is great, and to reduce the manual labor and increase the speed, the Turtle Lake Lumber Company at Winchester, Wis., is using a mechanical device shown in the illustrations for performing all the heavy lifting and carrying of material incident to track laying or lifting.

The machine consists of steel frame with a trolley track extending to the front and rear with an operating engine on the upper deck having two drums, one for the load line and the other for the traffic line to carry the trolley back and forth on the track. Steam is provided through pipe connections with the locomotive in attendance. In operation the machine rests upon one flat car in front and rails are deposited in the machine on this car. The second flat car is placed



HANDLING TIES WITH TRACK LAYING MACHINE

SECOND OPERATION—PLACING RAILS

between the machine and the locomotive for carrying the ties. An average load with ordinary equipment carries sufficient rails and ties to lay a quarter of a mile of track. The capacity of the equipment for the load of rails and ties depends upon the carrying capacity of the cars used and upon the railroad track.

There is ample space in the machine for carrying 150 sixty-pound rails and at the same time leaving sufficient room to pass a bundle of fifteen ties through the machine. An average load with ordinary equipment carries sufficient rails and ties to lay a quarter mile of track.

In laying track, the rail is picked up and carried out in front, as shown in the photograph, and dropped in place. When the two rails are laid and spiked, quarters and centers, the equipment is moved up a rail length and a bundle of ties deposited on the grade, sufficient to accommodate another rail length. A new bundle of ties is made ready while the last rail is being put in place, so that the time the machine is moved up a rail length, the next bundle of ties has been transferred to the front end of the boom. In addition to laying ties and rail the company has placed small bridges and culverts with this machine. The timbers or logs for constructing the bridge are placed with the machine without materially delaying its progress.

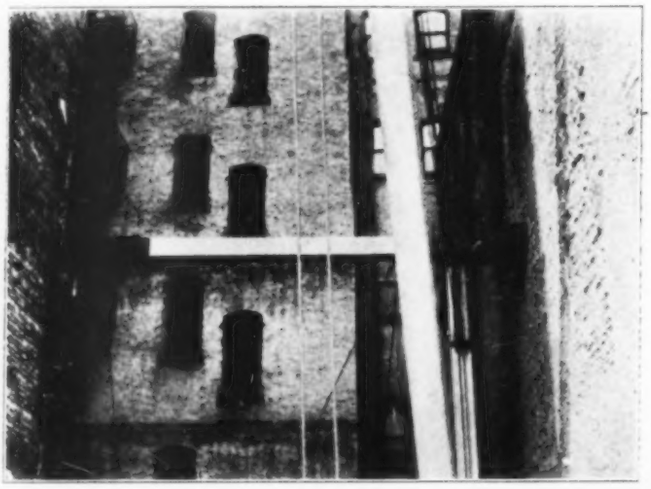
The usual crew consists of from 13 to 15 men, including foreman and locomotive crew, and about three times the amount of track is being laid with the machine as under the same conditions by hand methods. The boom or trolley track is built long enough in the rear to reach two car lengths, so that the machine can be mounted on the rear end and deposit rails on the next car and ties on the third car, which allows switching out of loads and placing in of empties. For taking up track continuously, the method is simply reversed.

Although this machine is used extensively on logging operations, it has proved popular in the tropics and places where it is difficult to gain access to the right of way. It is not necessary at any time for any of the workmen to walk alongside of the equipment on the right of way and they are not, therefore, inconvenienced or hindered when laying or taking up track in a swamp, on a trestle, in a narrow cut or on steep slopes or mountain sides.

The Turtle Lake Lumber Company finds this machine especially adaptable when laying old rails which are somewhat crooked or laying track on soft roadbed where ties and rail settle somewhat as the equipment is moved forward. In either case the ends of the last rail are laid point upward to such an extent as to require the next rail to be held in suspension or lifted up at a sufficient angle to allow the angle bars to be placed.

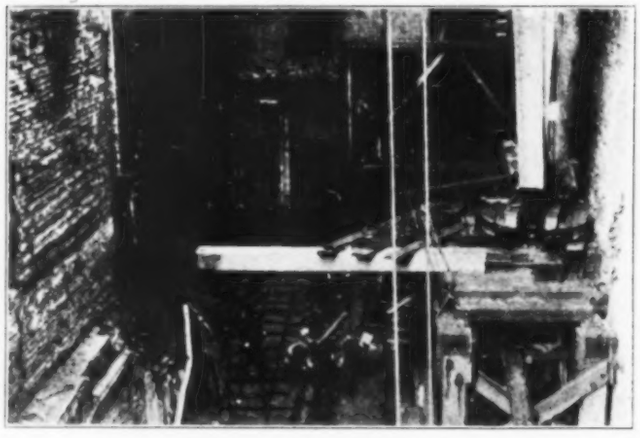
A DERRICK IN CLOSE QUARTERS

A STIFF leg derrick is a piece of construction equipment which is generally supposed to require at least sufficient space for its two legs and is not ordinarily a rig for cramped quarters. The above illustration shows such a derrick with one of its legs,



the rightful place for which is on the ground, some 32 ft. in the air. Angles were bolted to the steel frame of the adjacent building and the leg bolted to it, so that it becomes both a strut and a tie.

The leg on the ground has a weight-box suspended underneath, carrying 15 tons. The job is being done by Jarrett-Chambers Company, engineers and contractors, and the work is known as Section 3 of the new Standard Oil Building, which will extend from Broadway to Broad Street, on Beaver Street, New York City, and which, on account of the nature of the leases, is being built in sections. L. P. Hoover is superintendent for the contractors.



PAINTING METHODS

THE methods of applying paint to engineering structures, like other kinds of engineering work, are continually being improved upon. For some time past cold water paints used on mill buildings, factories, etc., have been applied by means of compressed air. A hand operated compressor forces the paint through a hose connected to a pipe and sprays the surface to be painted, leaving an even finish.

For interior work of a more delicate nature a Western contractor has developed a brush to which the paint is fed by means of a tube and operates on the principle of a fountain pen. The time required for dipping the brush in the can is saved.

LOADING TIME—ONE MINUTE

ANOTHER example of how contractors speed up concrete road building by cutting down time required to load trucks is shown in the accompanying illustration. Powers Brothers, of Brockton, Mass., are using this bin with its proportioning hopper underneath, in which the batch is made up before the truck arrives, cutting down the time of loading to 1 minute. The bins are of light construction and may be skidded along or knocked down and reassembled without a great amount of difficulty.

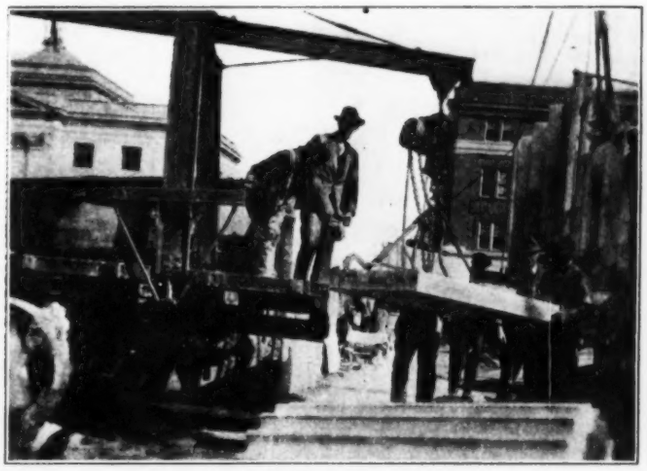
DRILLING UNDER WATER

AN interesting method of drilling holes for blasting with dynamite under water in connection with construction work is shown in the accompanying illustration. The men shown in the picture are employed on Scajaquada Creek at Buffalo, New York, where the Bituminous Paving Corporation has a contract for a diversion of the creek in order to eliminate spring floods heretofore encountered and also to improve sanitary conditions.

Holes for dynamite charges are being drilled in rock by means of hand-drills run by compressed air in a location that has from one to three feet of water. The dynamite used does its work just as well when immersed.

The drilling of holes under water for dynamite charges, which is known as submarine work, is one of the most difficult jobs which confronts the explosives engineer. In some cases, where the water is 18 ft. or more in depth, barges are employed with all drilling apparatus necessary, and sometimes these floats and their equipment cost as much as $1,000,000. In other so-called submarine work, where the water is shallow, tripod drills are employed.

CRANE RUNWAY ON TRUCK

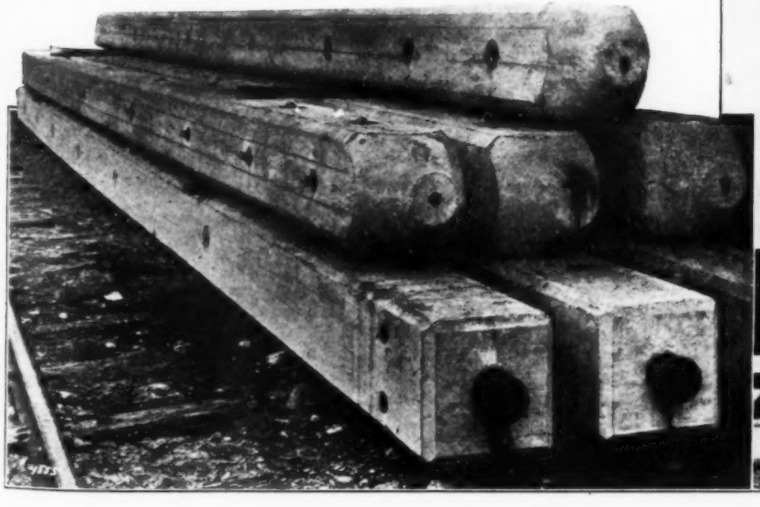


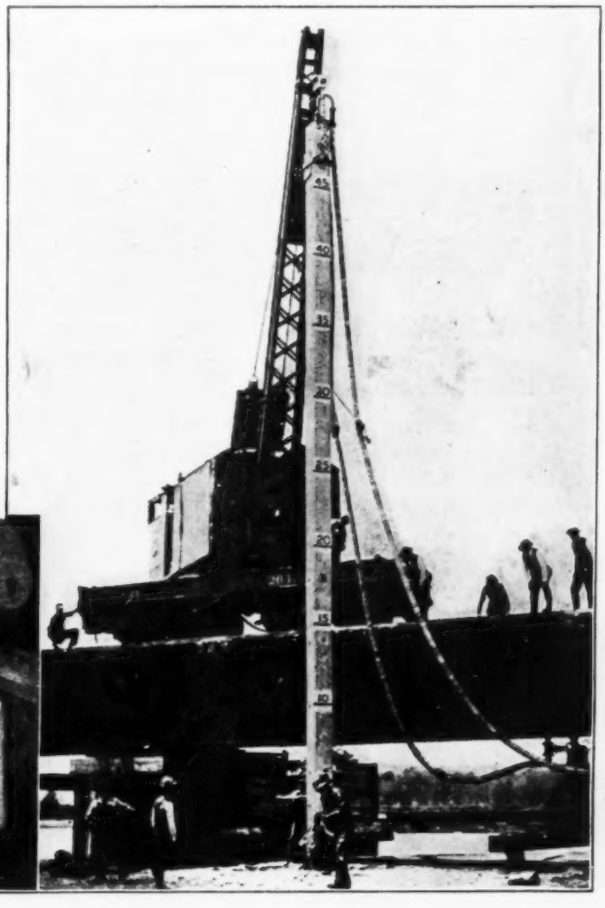
A CRANE runway made up of steel I-beams on which travels a chain hoist is part of the equipment of the motor truck shown in the photograph. McCormick Brothers, hauling contractors of Wilmington, Delaware, devised this method to facilitate the handling of heavy pieces, and the illustration shows them unloading cut stone for the new public library in Wilmington, Delaware, for the Du Pont Engineering Company, general contractors.

INNER TUBE HELPS IN SINKING PILE

THE photographs below and at the right show the test of a new style concrete pile at Omaha, Nebraska. This pile is 50 ft. long, weighs 13,000 lb. and was jetted 80 ft. into the ground in 11 minutes without the use of a hammer.

As may be seen in the lower photograph, a 4-in. casing, reduced to a 2-in. nozzle at the nose, runs through the center of the pile. Side jets lead from the inner casing to the surface of the pile on all four sides at intervals of 4 in. Elbows are attached to these jets, pointing toward the top of the pile. When ready for sinking, a 4-in. hose leading from a pressure pump was attached to the head of the pile and water under pressure of 225 lb. turned on.





Real Results

"THERE'S A REAL SHOVEL," said one of the owners enthusiastically, "one a good contractor can stake his reputation on."

As usual the two Type A-1 Thews were everlastingly at it. They were loading six yard trucks, digging hard pan and clay mixed with boulders and frost. Since they started in they had averaged over 1400 yards a day.

This contractor knows the satisfaction of owning a shovel that has repeatedly justified his entire confidence in its ability to produce. He doesn't hesitate to frankly say so either.

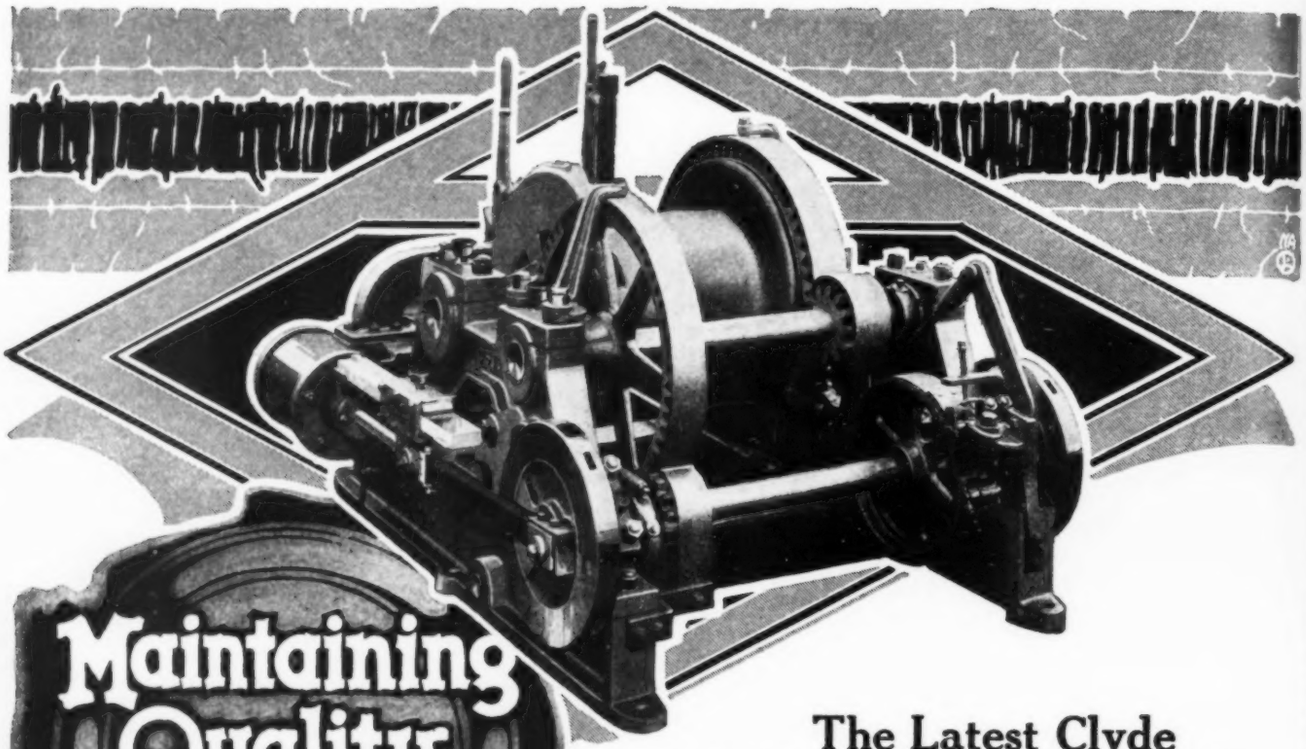
These one yard Thews were bought to be used on big yardage contracts but occasionally, in a lull, the owners pick off a small job and make money on it.

Just recently the shovel in the foreground made a quick and easy job of a 65′ x 35′ x 6′ cellar. Exactly six hours after it was started the excavation was finished and the shovel on it's way to another location.

Contractors who know, as these do, the results obtained with the Thew on big and little jobs, in tough and easy digging agree with this enthusiastic owner who says, "There's none better". Write for your copy of the latest Thew bulletin!

THE THEW SHOVEL COMPANY, LORAIN, O.

Thew Power Shovels



Maintaining Quality Standards

The Latest Clyde Perfected Swinging Engine

Recent improvements in this particular unit of the Clyde Line have demonstrated once again that "good enough" fails to satisfy the ideals of Clyde construction engineers.

Clyde supremacy in hoisting equipment must be maintained.

The new engine illustrated above has cut gears, cylinders with improved piston valve features, simplified throttle control and brake disc on the crank shaft, fitted with double-acting post type, asbestos lined friction band, controlled by a hand lever at the operator's position. The last feature is so effective that the operator can, with one finger, hold the engine stationary, with the throttle open under full head of steam.

These swingers can also be furnished with two outside drums, if so desired.

A request addressed to the home office or any of the branch houses will bring you complete information about this particular unit, or any other portion of the Clyde Line.

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Steam Hoists *Electric Hoists* *Gasoline Hoists* *Belt Hoists* *Derrick Fittings*
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Reducing the Cost of Derrick Operations

The recent improvements on the Clyde swinging engine are affecting directly that vital question of costs on derrick installations, regardless of location.

Positive, instantaneous control assures safer, more rapid operation.

The new swinging engine is built to use Clyde stock parts so far as possible. The bed frame is a one-piece casting, machined to receive the regular type side frames. The usual high quality, which has made Clyde the world's standard, is maintained throughout.

The same Clyde engineers who have made possible this marked advance in swinging engines are at your service if they can help in any way to solve your hoisting or excavating problems.

Comprehensive details on any Clyde-made machine furnished upon request.

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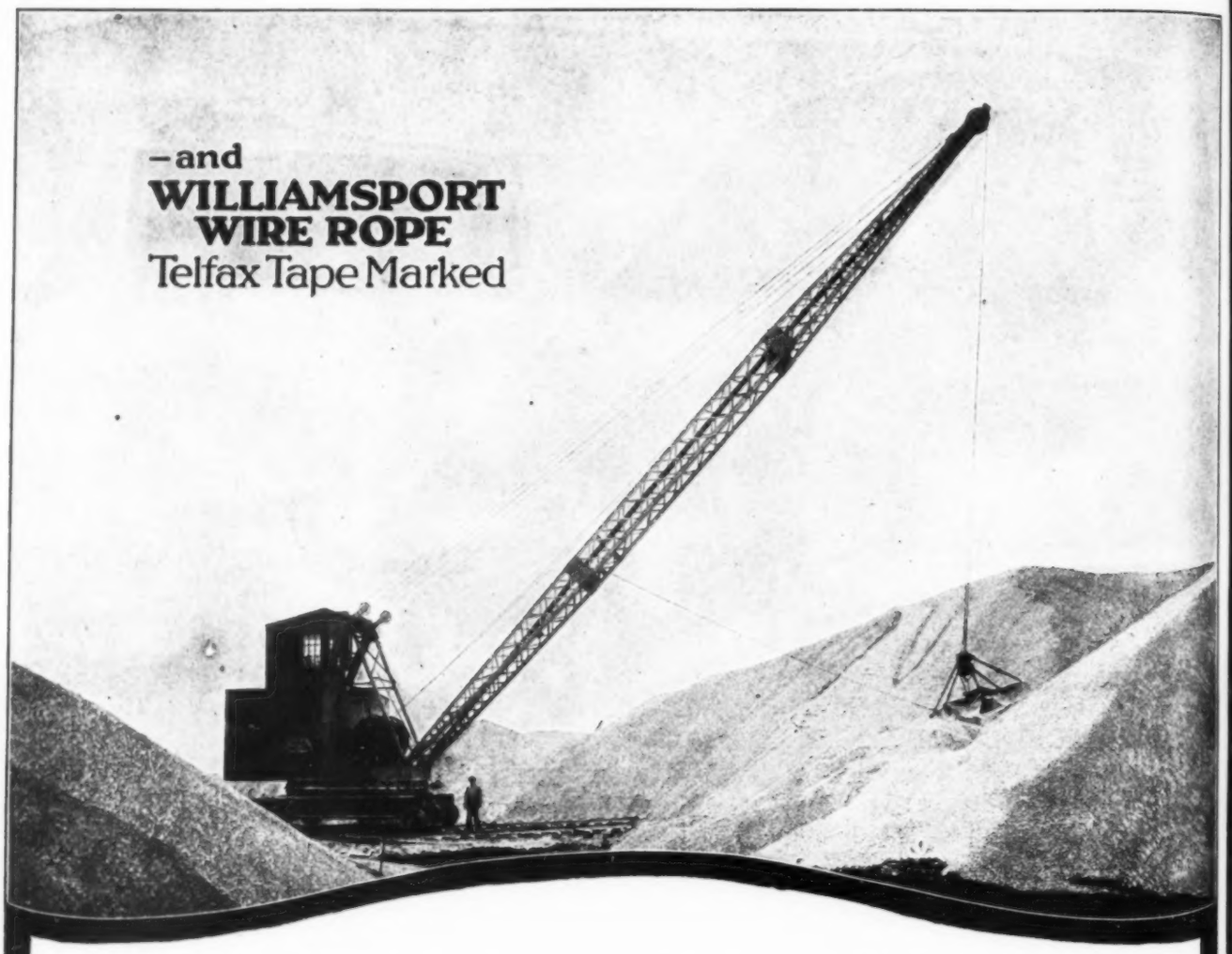

When Orton & Steinbrenner equip their mammoth cranes with

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Any crane manufacturer can sell a crane, equipped with *inferior* rope or reputable rope of *uncertain* grade and sell the unit for less than if "Williamsport" equipped.

If you want to know for a certainty the make and grade of wire rope you get, add to your specifications "and Williamsport Wire Rope, Telfax Tape Marked."

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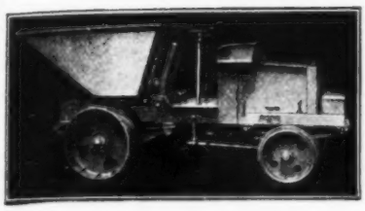
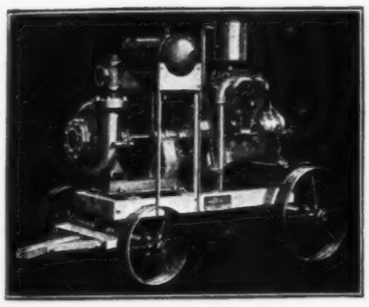
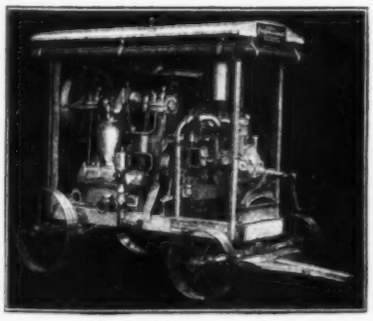
Contractors' Equipment



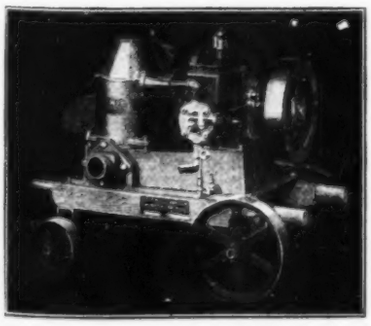
C. H. & E. Tractor



C. H. & E. Centrifugal Pump



C. H. & E. Triplex Pump



C. H. & E. Bilge Pump

WHEREVER you go on small or large jobs you find one or more CH&E outfits in operation. In excavation or trench work you find a Trench Pump busy pumping water; in road building you find a Triplex Pump forcing water to the mixer; in sawing form lumber and house building, you find a Portable Saw Rig; in hoisting work an electric or gasoline engine driven Hoist, Double Cage Material Elevator; in mixing mortar, a CH&E Mortar Mixer will save you lime, and high labor expense. Our Tractor for road work or industrial work will help you. You should have one of our new catalogs just off the press.

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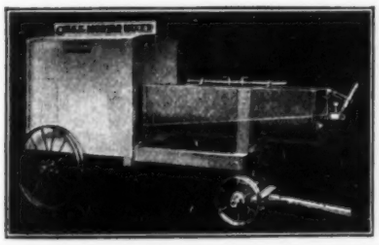
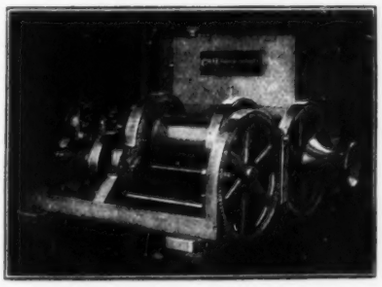
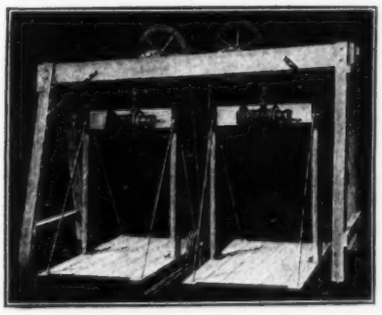


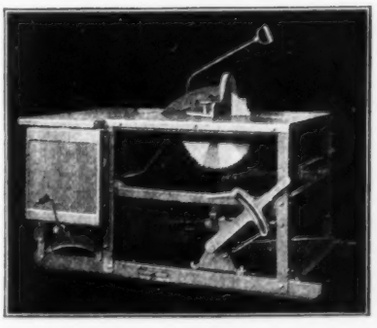
C. H. & E. Mortar Mixer



C. H. & E. Builders' Hoist

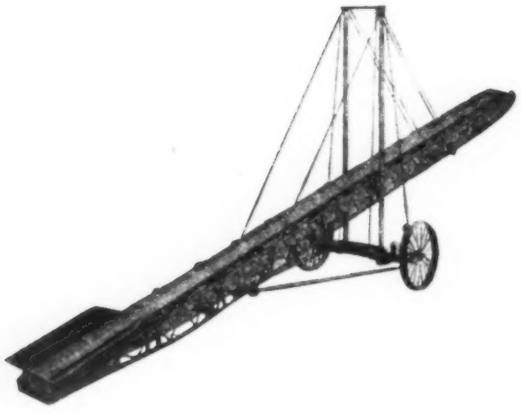


C. H. & E. Material Elevator



C. H. & E. Saw Rig

Speed Your Work With B



HANDLING costs with the outfit shown here averaged 7 cents a ton for three years. This is a saving of 8 cents a ton over the hand method formerly used at the Crume Brick Co., Dayton, Ohio. Also, all delays in this plant on account of shortages of sand have been eliminated.

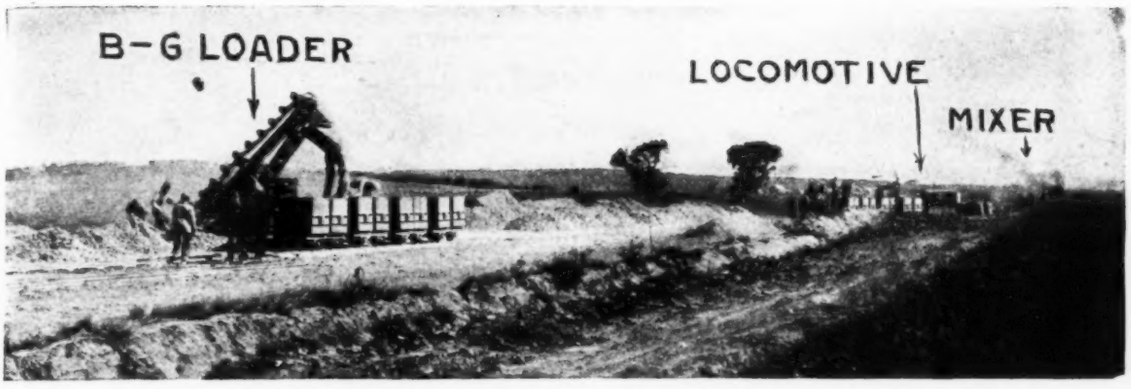
Portable conveyors similar to the one shown in the small photograph are being used now on road jobs for unloading gravel and sand from cars to storage, handling bulk and sacked cement and other jobs. In many cases they will do the work of a stiffleg or crane at less expense and in less time. The conveyor shown is working on a road job for St. Louis County, Mo.

If you are not satisfied with the speed or efficiency you are getting handling materials, investigate the possibilities of B-G Conveyors.

Write us. We can send an engineer, without cost or obligation to you, to go over your job and tell you what B-G machines can do on it. Or we can send a performance bulletin which shows many successful applications now working. ***Ask for Bulletin B.***

B STANDARDIZED MATERIAL-HANDLING MACHINES G

h B-G Loaders and Conveyors

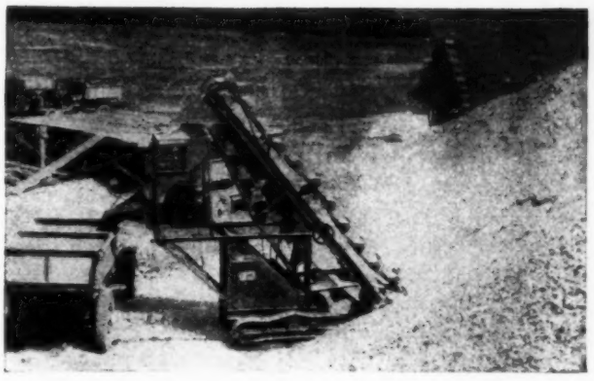


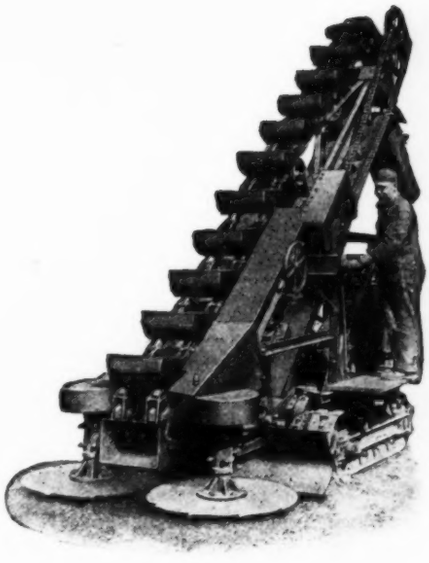
AN increase of 23% in output was gained by J. J. Belotte, Troy, N. Y. who replaced shovelers and wheelbarrow pushers with a Ford truck and a Barber-Greene.

You can do the same on your job with a Barber-Greene Loader. Other contractors, as shown by the photographs, use one or more machines with various kinds of haulage systems.

When you get the materials to the mixer as fast as possible, your output is bound to be close to the maximum. You can do this by using a Barber-Greene to load your cars, trucks or wheelbarrows. This machine will act as a pacemaker and furnish a reliable means of getting your materials steadily and speedily into the mixer.

If things are not going just as you planned them, have one of our engineers look over your job. He will not tell you how to build roads, but he can tell you how much you can increase your present output with a Barber-Greene Loader. This service will cost you nothing and will put you under no obligation. ***Write for it today.***





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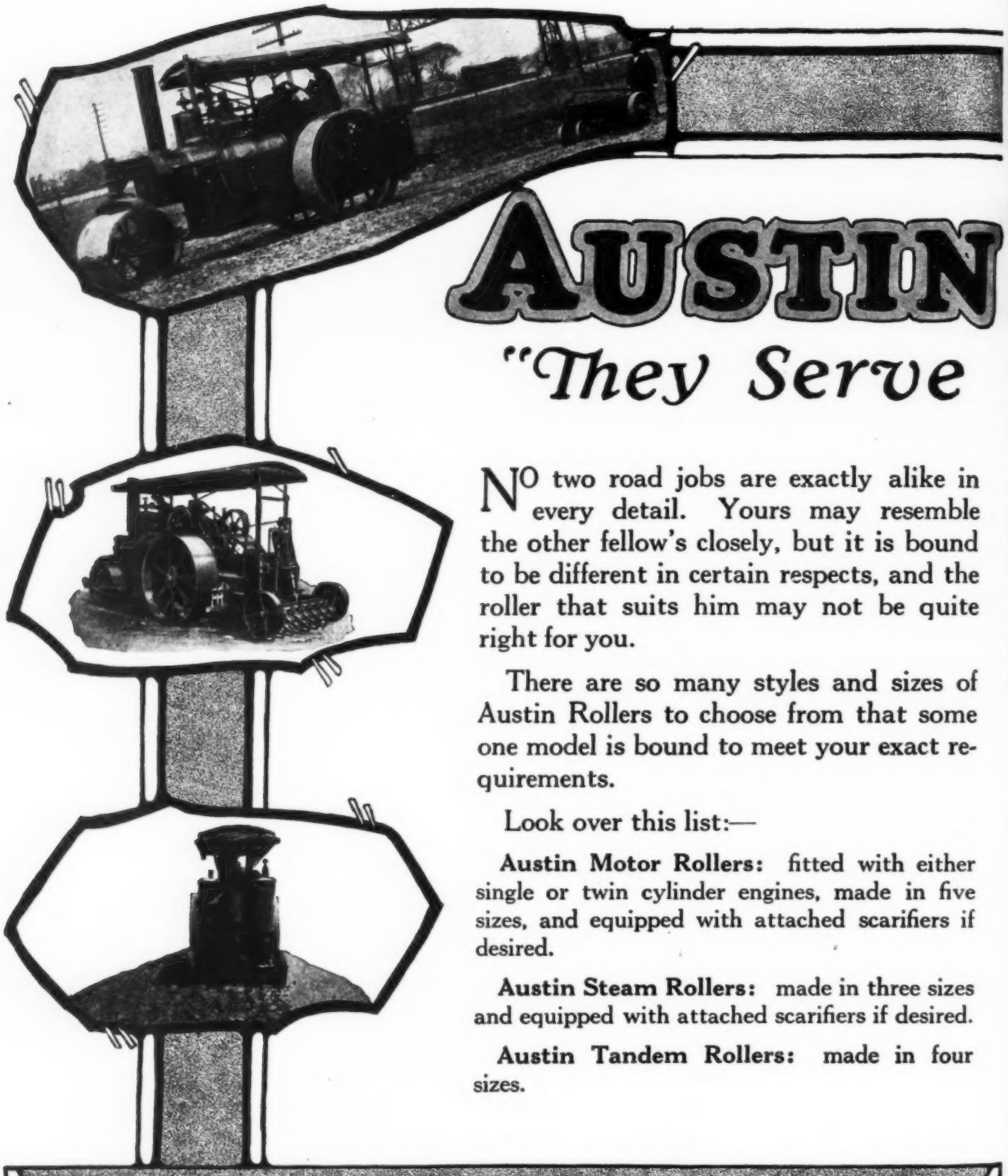
Canadian Agents: Mussens Limited, Montreal, Winnipeg, Toronto, Vancouver

Export Dept: Allied Machinery Company of America, 51 Chambers Street, New York City



AUSTIN

"They Serve

NO two road jobs are exactly alike in every detail. Yours may resemble the other fellow's closely, but it is bound to be different in certain respects, and the roller that suits him may not be quite right for you.

There are so many styles and sizes of Austin Rollers to choose from that some one model is bound to meet your exact requirements.

Look over this list:—

Austin Motor Rollers: fitted with either single or twin cylinder engines, made in five sizes, and equipped with attached scarifiers if desired.

Austin Steam Rollers: made in three sizes and equipped with attached scarifiers if desired.

Austin Tandem Rollers: made in four sizes.

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The Austin-Western Road Machinery Co.

CHICAGO, ILLINOIS

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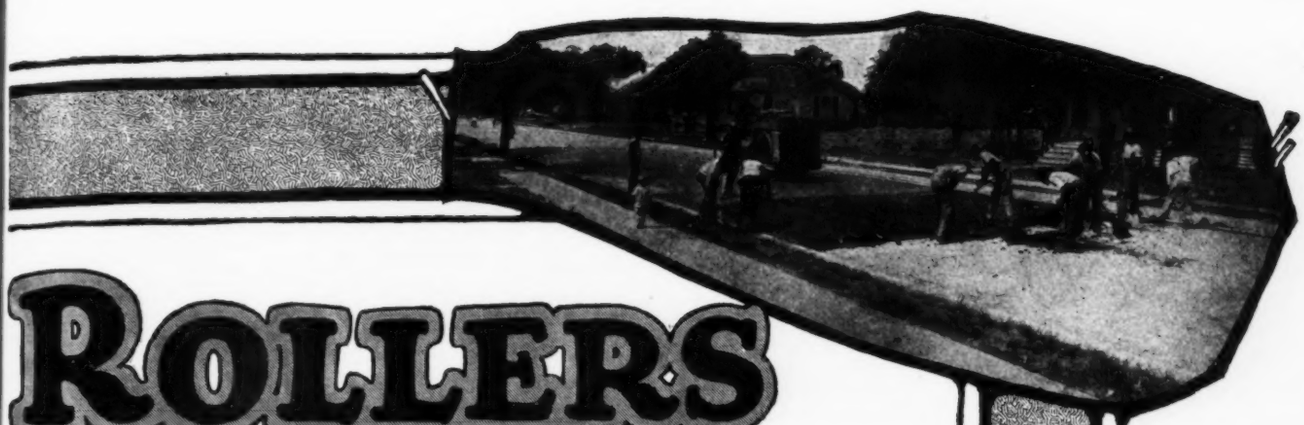
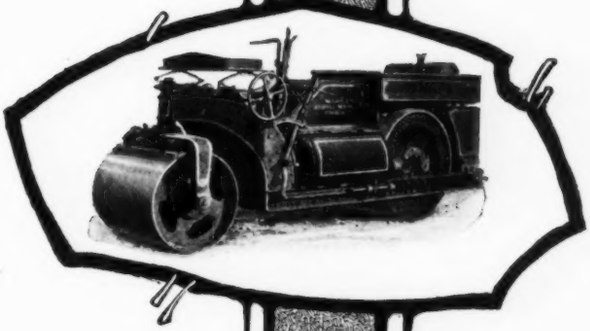


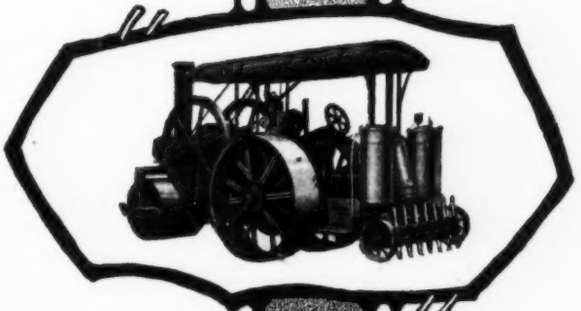
ROLLERS

You Right"

SINCE you have such a wide variety to choose from, the Austin Roller you select will "Serve You Right" from the start because it is just as good as made to order for your special needs. Also it will continue to "Serve You Right" for many years because it is correct in design, sound in material and workmanship; and is backed by a complete service organization that lives up to its name.

The whole story of Austin Rollers is told in **Catalog FX.** You will find it interesting reading, and if you are going to need a new Roller this year, you can't afford to pass it up. Then there is General **Catalog 21-X**, which describes the entire Austin-Western "Serves You Right" Line. Send for one or both of these catalogs today.





The Austin-Western Road Machinery Co.

CHICAGO, ILLINOIS

"They Serve You Right"

AUSTIN			WESTERN		
Motor Rollers	Elevating Graders	Street Sprinklers	Rock Crushers	Road Planers	Drag Scrapers
Steam Rollers	Road Scarifiers	Road Oilers	Reversible Graders	Road Scarifiers	Road Plows
Rock Crushers	Motor Sweepers	Dump Wagons	Elevating Graders	Road Drags	Ditchers
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Built in all practical sizes, from 1 cu. yd. to 45 cu. yd. capacity.

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